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FOCUS

Global Climate Change & Biodiversity

Of late, there has been great consternation about the future of the Earth, the kind of global climatic changes that are forecasted, and the implications of these changes on the flora and fauna of the planet. The issues related to climate change have literally become a universal agenda at most of the national and international forums. Scientists have already observed several effects of climate change, including rising sea levels, shrinking glaciers, changes in the range and distribution of plants and animals (biodiversity), trees blooming earlier, rivers and lakes in colder regions freezing later and melting earlier, and the thawing of permafrost.

Climate is the average weather over a long period of time. The components of the global climate are atmosphere (air), hydrosphere (water), cryosphere (ice sheets), biosphere (living organisms), and the geosphere (soils, sediments and rocks). These components interplay with one-another to create and maintain climate. Any alteration in any of these components would have a corresponding impact on the climate. The biosphere (especially human beings) has had an increasingly greater impact on climate during recent decades. There is increasing evidence that human activities are altering our climate at an unprecedented rate. The scientific community generally agrees that the globe has warmed over the past 40 years, largely due to anthropogenic causes. Energy use, transit, and land management have sharply increased the atmospheric concentration of common greenhouse gases like carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons (CFCs), increasing average global temperatures. Carbon dioxide levels alone are higher now than at any time in the past 400,000 years.

According to data from the National Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA), the Earth's average surface temperature has increased by about 1.2 to 1.4°F since 1900. If this trend persists and greenhouse gases continue to increase, climate models predict that the average temperature at the Earth's surface could increase from 2.5 to 10.4°F above 1990 levels by the end of 21st century. Higher temperatures are expected to raise sea levels by expanding ocean water, and melting mountain glaciers including portions of Greenland and the Antarctic ice sheets. Arctic ice is

gradually getting thinner, melting and rupturing. The polar ice cap is shrinking at a rate of nine percent each decade. This could lead to ice-free summers in the Arctic by the end of this century. In addition, sea levels are rising along most of the U.S. coast, and around the world. The past century has registered an average sea level rise of 5 to 6 inches more than the global average along the Mid-Atlantic and Gulf Coasts. The Intergovernmental Panel on Climate Change (IPCC) established in 1988 jointly by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) estimates that global average sea levels will rise between 0.3 and 2.9 feet (0.09 to 0.88 meters) in the next century. Rising sea levels would pose a serious threat to ports, coasts, coastal cities, islands, and many low-lying countries of the world. Scientists predict that hurricanes like Katrina or Rita could be far more deadly in the future because of rising sea levels.

The Earth's climate has never been constant. It has and will always vary for natural reasons. It has varied since the development of the most primitive atmosphere. If we examine the geological time scale, the Earth has undergone events ranging from ice ages to long periods of warmth. Earth's climate has been affected by natural factors such as volcanic eruptions, changes in the Earth's orbit, and the amount of energy released from the sun. Nature has caused remarkable transformations in the past. But, since the dawn of the Industrial Revolution in the late eighteenth century, human activities have begun to change the composition of the atmosphere and influence Earth's climate at an unprecedented rate.

Ecosystems have a limited capacity to adapt to climate change. Through different eras, the inhabitants of this planet have adapted and evolved with the changing climatic conditions of their surroundings. When the rate and extent of climate change exceeds nature's maximum adaptation speed, it may lead to the extinction of several species. Inability to adapt to rapid environmental changes has drastic implications.

As a rule, the greater the degree of biodiversity the more stable and resilient the Earth's ecology. Ongoing habitat destruction is driving several species to extinction. It is estimated that by 2100 two-thirds of the Earth's remaining species might become extinct. Biodiversity is essential and vital to our survival as a species.

Numerous species of plants are constantly purifying the air by recycling oxygen. Similarly, wetland ecosystems have their own role in maintaining water quality. Naturally occurring microorganisms detoxify and decompose about 130 billion metric tons of organic waste every year. By acting as repositories of carbon, plants and other organic materials contribute to climate stabilization, both within land and ocean ecosystems. By binding soil, forests and grassland prevent erosion, nutrient loss, and landslides. They also prevent and reduce floods by absorbing excess water. A vast majority of the world's food, including fish meat, eggs, milk, honey, mushrooms, and spices depends on biodiversity. In addition to providing food, biodiversity is also crucial to the world's health. As per the World Heath Organization (WHO), 80 percent of people in the developing world rely on traditional medicines derived mainly from plants. In Southeast Asia, about 6,500 species of plants are used for their medicinal properties. Even microbes and animal species have been known to contribute to a range of medicines. Penicillin – derived from the fungus *Pencillium notatum* – is one of the first and still widely used antibiotics.

Climate change is a complex, long-term challenge that calls for a sustained global commitment to manage it effectively. Many governments, international organizations and non-governmental organizations have come forward to show their concern and seek solutions to this global problem. The first United Nations Conference on the Human Environment was held in 1972 in Stockholm, Sweden, which led to the establishment of the United Nations Environment Programme (UNEP). This conference raised awareness about the global environment and tried to establish a relationship between development and the environment. Since then there have been many international environmental agreements. In 1983, the United Nations General Assembly set up the World Commission on Environment and Development, known as the Brundtland Commission after its chairperson, Gro Harlem Brundtland. Its report, *Our Common Future*, published in 1987, used the term "sustainable development" and emphasized economic development without endangering the environment. The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 with an objective of evaluating the scientific evidence on global warming, assessing the environmental and agricultural impacts of climatic change, and formulating responses.

In 1992, representatives from 178 nations, non-governmental

agencies (NGOs) and other interested parties met in Rio de Janeiro, Brazil to discuss global environmental issues. This first United Nations Conference on Environment and Development (UNCED) is widely regarded as the most important international environmental conference to date and is popularly known as the Earth Summit. The Summit resulted in treaties on biodiversity and climate change, and the assembled countries adopted "Agenda 21" – a blueprint to promote sustainable development. The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992, which entered into force in 1994 with the ultimate objective of stabilizing greenhouse gas concentrations in the atmosphere. The convention also led to the establishment of a Conference of the Parties (COP) which functions as the supreme implementing body of the Convention. In 1997, the third COP session held in Kyoto, Japan resulted in the adoption of the Kyoto Protocol to the UNFCCC. The protocol calls for legally binding commitments to reduce greenhouse gas emissions by 5.2% below 1990 levels by the period 2008-2012. The Kyoto Protocol entered into force on 16 February 2005 following ratification by Russia in 2004.

The United States is committed to environmental safeguarding and clean energy solutions and is working with the international community to confront climate change in a manner that does not adversely affect nations' abilities to promote economic growth and development. The annual U.S. celebration on April 22 of Earth Day affirms commitment to the environment. It is a time when Americans assess the work still needed to protect the planet. The United States is working domestically and internationally to address the long-term challenge of global climate change and is party to a number of major international agreements. It is working in partnership with other governments, non-governmental organizations, and the private sector to transform how energy is produced and consumed. President Bush has set an ambitious target of cutting greenhouse gas emissions by 18 percent by the year 2012. In September 2006, the U.S. Department of Energy released the Climate Change Technology Program (CCTP) in accordance with the President's vision to harness America's strengths in technological innovation in order to transform energy production and its use in ways that significantly reduce greenhouse gas emissions over the long term.

Also, the United States has joined with Australia, China, India, Japan, and South Korea to create the Asia-Pacific Partnership on

Clean Development and Climate (APP), also known as AP6, an innovative U.S.-led effort to accelerate the development and deployment of clean energy technologies through voluntary public-private partnership among six major Asia-Pacific nations that account for about half of the world's population and more than half of the world's economic output and energy use. And on April 2, 2007, the U.S. and India signed a memorandum of understanding (MOU) renewing their commitment to work cooperatively on environmental issues.

The articles included in this section explore the issue of climate change and its consequences and explain current and proposed initiatives to protect the environment while also encouraging economic development.

For additional information, a webliography is presented here for your use. The inclusion of Internet sites other than those of the U.S. government should not be construed as an endorsement of the views contained therein. The websites are current as of date and are subject to change at any time.

Asia-Pacific Partnership on Clean Development and Climate
http://www.asiapacificpartnership.org/

Center for International Earth Science Information Network
http://www.ciesin.columbia.edu/

Climate Change and Clean Energy
http://usinfo.state.gov/gi/global_issues/climate_change.html

Climate vision
http://www.climatevision.gov/

Destination Earth
http://www.earth.nasa.gov/flash_top.html

Earth Day Network
http://www.earthday.net/

The EnviroLink Network
http://www.envirolink.org/index.html

Environmental Climate Change Analysis
http://www.eia.doe.gov/oiaf/1605/climate.html

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Energy Emissions Data and Environmental Analysis of Energy Data
http://www.eia.doe.gov/environment.html

Environmental Education on the Internet
http://www.eelink.net/

Environmental Law Institute
http://www2.eli.org/index.cfm

Global Warming: Early Warning Signs
http://www.climatehotmap.org/

Intergovernmental Panel on Climate Change (IPCC)
http://www.ipcc.ch/

Knowing Your World
http://www.urbanext.uiuc.edu/world/

Massachusetts Institute of Technology – Joint Program on the Science and Policy of Global Change
http://web.mit.edu/globalchange/www/

NASA – GISS Surface Temperature Analysis (GISTEMP)
http://data.giss.nasa.gov/gistemp/

National Centers for Environmental Prediction (NCEP)
http://www.ncep.noaa.gov/

National Climatic Data Center – Climate Monitoring
http://www.ncdc.noaa.gov/oa/climate/research/monitoring.html

National Environmental Partnership Summit
http://www.environmentalsummit.org/

National Institute of Environmental Health
http://www.niehs.nih.gov/science-education/home.htm

National Oceanic and Atmospheric Administration (NOAA)
http://www.noaa.gov/

National Renewable Energy Laboratory
http://www.nrel.gov/

Natural Resources Defense Council
http://www.nrdc.org/

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Pew Center on Global Climate Change
http://www.pewclimate.org/

Sierra Club
http://www.sierraclub.org/

U.S. Climate Change Science Program
http://www.climatescience.gov/

U.S. Department of State – Earth Day
http://usinfo.state.gov/gi/global_issues/environment/earth_day.html

U.S. Environmental Protection Agency
http://www.epa.gov/

U.S. Global Change Research Program
http://www.usgcrp.gov/

U.S. Government Portal—Earth Day
http://www.earthday.gov

United Nations Development Programme – The Importance of Biodiversity
http://www.undp.org/biodiversity/biodiversitycd/bioImport.htm

United Nations Environment Programme
http://www.unep.org/

United Nations Environment Programme(UNEP) – Climate change
http://climatechange.unep.net/

United Nations Framework Convention on Climate Change
http://unfccc.int/2860.php

White House Council on Environmental Quality
http://www.whitehouse.gov/ceq/

World Meteorological Organization (WMO)
http://www.wmo.ch/

1. BIODIVERSITY: THE INTERPLAY OF SCIENCE, VALUATION, AND POLICY

By Cheryl Lyn Dybas. Bioscience, v. 56, no. 10, October 2006, pp. 792-798.

Three hundred scientists, economist, journalists, educators, and others met at the American Institute of Biological Sciences (AIBS) 56th annual meeting in Washington, DC, in May 2006 to seek ways to preserve Earth's biodiversity. The participants unanimously agreed that biodiversity is undergoing metamorphosis and some of the existing species are facing danger of extinction. Apart from economists, even policy makers are now recognizing the economic values associated with biodiversity. Scientists have documented the variety of services provided by diverse ecosystems. As per the report of the AIBS meeting, human actions have dramatically transformed virtually all of Earth's ecosystems.

2. THE CHANGING FACE OF NORMAL DISASTER: RISK, RESILIENCE AND NATURAL SECURITY IN A CHANGING CLIMATE

By Nathan E. Hultman and Alexander S. Bozmoski. Journal of International Affairs, v. 59, no. 2, Spring/Summer 2006, pp. 25-41.

Both disaster management and climate change mitigation fundamentally attempt to reduce the trauma inflicted by natural hazards and to provide a smooth recovery from perturbations. The vulnerability, resilience and burden-sharing capacity form a link between climate change and disaster management. This paper looks at the interface between these arenas. Significant changes in climate at both global and regional scales are expected over the next century. Climate change is likely to increase chronic natural hazards. Climate change will not be uniform; rather it will be uneven across different regions of the globe. Global losses are expected to outweigh the benefits. Currently, policy attention is focused on strategies for managing the next disaster.

3. CLEAN ENERGY FOR TOMORROW

By Paula Dobriansky. eJournal USA, July 2006, pp. 4-7.
http://usinfo.state.gov/journals/ites/0706/ijee/ijee0706.pdf

The world needs affordable and clean energy to fuel economic growth, development, and democracy without harming the environment. The United States is confronting this challenge with transformational technologies, the creativity of entrepreneurs, and support for local initiatives in the developing world. The U.S. is committed to protecting the environment and promoting energy security. In his January 2006 State of the Union address, President George W. Bush outlined a strategy to reduce America's dependence on oil. Beyond the development of clean energy technologies, it is also important to make them affordable and accessible. The U.S. government has spent more than $11.7 billion since 2001 to develop alternative energy sources. The U.S. approach draws upon the best scientific research, harnesses the power of markets, fosters the creativity of entrepreneurs, and works with the developing world to meet its dual aspirations for vibrant economies and a clean environment.

4. CLIMATE CHANGE: SCIENCE AND POLICY IMPLICATIONS

By Jane A. Leggett. CRS Report for Congress, January 25, 2007, 47 p.

Almost all scientists agree that the Earth's climate is changing. Since the Industrial Revolution, it has warmed by 0.6 to 0.8° Celsius (1.1 to 1.5° Fahrenheit). During the 20th century, some areas became wetter while others experienced more drought. Although natural forces such as solar irradiance and volcanoes contribute to variability, scientists cannot explain the climate changes of the past few decades without including the effects of elevated greenhouse gas (GHG) concentrations resulting from fossil fuel use, land clearing, and industrial and agricultural emissions. Forecasting future climate conditions is challenging, and some major processes remain poorly understood. However, methods are improving to characterize the risks. Scientists have found it is very likely that rising greenhouse gas concentrations, if they continue unabated, will raise the global average temperature above natural variability by at least 1.5° Celsius (2.7° Fahrenheit) during the 21st century (above 1990 temperatures), with a small likelihood that the temperature rise may exceed 5°C (9°F). Future climate change may advance smoothly or sporadically, with some regions experiencing more fluctuations in temperature, precipitation, and frequency or intensity of extreme events than others. The continuing scientific process has resulted in a better understanding of climate change. The principal questions remaining for the majority of scientists concern not whether greenhouse gases will result in climate change, but the magnitude, speed, geographic details, and likelihood of surprises, and the appropriate timing and options involved in addressing climate change.

5. CLIMATE CHANGE: THE KYOTO PROTOCOL AND INTERNATIONAL ACTIONS

By Susan R. Fletcher and Larry Parker. CRS Report for Congress, January 24, 2007, 14 p.

The United States was one of the first nations to sign and ratify the United Nations Framework Convention on Climate Change (UNFCCC) – the first treaty to address climate change, which was completed and opened for signature in 1992. Later, the demand for mandatory reductions in the level of six major greenhouse gases especially carbon dioxide paved the way for the Kyoto Protocol, which was completed in 1997 and entered into force in February 2005. The United States has not ratified the Protocol, and thus is not bound by its provisions. Although, it signed the Protocol in late 1998, President Clinton did not submit the Protocol to the Senate for approval because certain conditions outlined by Senate Resolution 98, passed in mid-1997 – including meaningful participation by developing countries in binding commitments limiting greenhouse gases – had not been met. In March 2001, the Bush Administration rejected the Kyoto Protocol, and subsequently announced a U.S. policy for climate change that relies on voluntary actions to reduce the "greenhouse gas intensity" (ratio of emissions to economic output) of the U.S. economy by 18% over the next 10 years. On a "parallel track" of Kyoto Protocol activities, the United States took an initiative in 2005, the Asia-Pacific Partnership for Clean Development and Climate, together with China, India, Japan, Australia, and South Korea, which is a voluntary effort to reduce the greenhouse gas intensity of their economies through technological cooperation. Annual meetings of the parties to the Kyoto Protocol continue, and attention during the negotiations has turned in large part to "next steps" following the end of the commitment period in 2012, as well as a review of the effectiveness of the Protocol. Major challenges remain to find agreement on the nature of commitments, if any, that would be acceptable to all major players.

6. FORECASTING THE EFFECTS OF GLOBAL WARMING ON BIODIVERSITY

By Daniel B. Botkin, et al. Bioscience, v. 57, no. 3, March 2007, pp. 227-236.

It is now widely accepted that that global warming is happening. This has led to a growing demand for accurate forecasts of its effects on biodiversity. The current methods for forecasting have their limitations. In this article the authors have compared and discussed different uses of some forecasting methods. Different uses and limitations of these methods have been outlined. The authors show that although the current empirical and theoretical ecological results indicate global warming risk for several species, during recent ice ages few species became extinct. The article provides an insight into the necessity of more accurate and reliable forecasting of the effects of global warming on biodiversity. The authors, in this article, have suggested eight ways to improve biodiversity forecasting.

7. GLOBAL CLIMATE CHANGE AND WILDLIFE

By Pervaze A. Sheikh, et al. CRS Report for Congress, February 6, 2007, 6 p.

Major climate shifts in the past have demonstrated that climate change can have severe repercussions for ecological systems. Recently projected climate changes could have widespread effects on wildlife species. These effects may include extinctions, changes in species' ranges, mismatches in their phenology (timing of pollination, flowering, etc.), and population declines. Other species could flourish in response to projected climate change. Effects of climate change on wildlife have been reported for some species and populations in localized areas. Many studies also show that climate change acts in concert with other variables to effect changes in species. Wildlife adaptation to the projected widespread climate change is still uncertain. While some suggest that evolution and migration will enable species to adapt, others contend that adaptation will be minimal because changes in climate may occur too rapidly for species to adapt.

8. GROWING UP

By Carl Bruch. The Environmental Forum, v. 23, no. 3&4, May/June 2006, pp. 28-33.

International environmental law is now in its adolescence. Since the 1972 Stockholm Conference, hundreds of multilateral environmental agreements have been adopted. From the early 1970s through the 1990s, several global, regional, and bilateral environmental agreements were negotiated. Currently, there are more than 700 environmental treaties, conventions, protocols, and other pacts. However, most of them are awaiting proper implementation mostly because of funding difficulties along with political problems. The international community conforms to the United States's argument that the world should focus on implementing existing agreements, and not on creating new ones.

9. THE INEQUITY OF THE GLOBAL THREAT TO CORAL REEFS

By Simon D. Donner and David Potere. Bioscience, v. 57, no. 3, March 2007, p. 214.

Human activities and climate change in recent years have emerged as possible threats to coral reefs. Over the next century, higher concentrations of atmospheric carbon dioxide, and associated changed in ocean chemistry, may further reduce coral reef ecosystems. While climate change is expected to pose a serious threat to many of the world's coral reef ecosystems, the majority of the people who depend on coral reefs for shoreline protection, fisheries, and tourism revenue live in poor, developing countries that are responsible for only a tiny fraction of the world's greenhouse gas emissions.

10. IS THE WORLD OCEAN WARMING? UPPER-OCEAN TEMPERATURE TRENDS: 1950-2000

By D. E. Harrison and Mark Carson. Journal of Physical Oceanography, v. 37, iss. 2, pp. 174–187

Subsurface temperature trends of the World Ocean exhibit that there is large spatial variability of 51-year trends in the upper ocean, with some regions showing cooling in excess of 3°C, and others warming of similar magnitude. Most analysis shows that oceans have both cooled and warmed over 20-year subsets of this period. There is much space and time variability of 20-year running trend estimates, indicating that trends over a decade or two may not be representative of longer-term trends. Results are based on sorting individual observations in the World Ocean Database 2001 into 1° × 1° and 2° × 2° bins. The patterns of the 90% significant trends are spatially coherent on scales resolved by the bin size. Additional attention should be given to uncertainty estimates for basin average and World Ocean average thermal trends.

11. MONITORING AND PREDICTION OF THE EARTH'S CLIMATE: A FUTURE PERSPECTIVE

By Kevin E. Trenberth, et al. Journal of Climate, v. 19, iss. 20, October 15, 2006, pp. 5001–5008.

Despite all mitigation actions, climate will continue to change. In the light of major advancements in technology, this paper seeks to predict kind of climate information system we might have in the future and how that would occur. Advancements in satellite technology have opened new horizons in observing and tracking changes. These observations have to be taken in ways that satisfy climate monitoring principles. Satellite observations must be calibrated and validated. Data, along with the metadata, should be appropriately archived with full and open access. Further, attribution of changes to causes is essential. Also, it is vital to fully assess past changes and model performance and results in making predictions. The authors also anticipate a revolution in the way developing countries use and apply climate information.

12. A MULTIMODEL UPDATE ON THE DETECTION AND ATTRIBUTION OF GLOBAL SURFACE WARMING

By Dáithí A. Stone, Myles R. Allen, and Peter A. Stott. Journal of Climate, v. 20, iss. 3, February 1, 2007, pp. 517–530.

This article provides an update on the detection and attribution of global annual mean surface air temperature changes, using recently developed climate models. It illustrates a new methodology that permits the inclusion of many more general circulation models (GCMs) into the analysis, and it also includes more recent observations. This methodology involves fitting a series of energy balance models (EBMs) to GCM output. The results indicate an emerging constraint for global mean surface temperature responses to external forcings across GCMs, which is corroborated in the observed record. This indicates that observationally constrained estimates of past warming and predictions of future warming are becoming robust.

13. A RADICAL STEP TO PRESERVE A SPECIES: ASSISTED MIGRATION

By Carl Zimmer. The New York Times, January 23, 2007.

Studies on the Bay Checkerspot butterfly, in the San Francisco Bay area, suggest that climate change will push the insect to extinction. Many other species are also facing similar threat. This has posed a serious concern to conservation biologists. Assisted migration is one possible answer. Although plagued by uncertainties and risk, it may be the only way to save some of the world's biodiversity.

14. UNDERSTANDING CLIMATE AND GLOBAL CHANGE

By Richard H. Moss. eJournal USA, June 2005, pp. 17-19.
http://usinfo.state.gov/journals/itgic/0605/ijge/ijge0605.pdf

The role and importance of climate and its variability in shaping our environment, natural resources, infrastructure, economy and other aspects of life is well understood. However, to make informed judgments and decisions, decision makers need reliable information. The United States has taken the lead and has heavily invested in scientific research, monitoring, data management, and assessment for climate change analyses to build a foundation of knowledge for decision making. The U.S. Climate Change Science Program (CCSP) coordinates the scientific activities of some 13 federal government agencies and departments and seeks to provide the United States and the global community with the science-based knowledge to manage the risks and opportunities of change in the climate and related environmental systems.

15. USA: ENERGY NEEDS, CLEAN DEVELOPMENT AND CLIMATE CHANGE: PARTNERSHIPS IN ACTION

U.S. Department of State, 29 p.
http://www.state.gov/documents/organization/75455.pdf

The United States's approach to climate change reflects the view that the most effective way to deal with the issue is through a broad agenda. It aspires to bring all stakeholders to the table and encourage meaningful global participation through actions that will reduce greenhouse gas emissions, improve energy security and cut air pollution that is harmful to human health and natural resources while ensuring continued economic growth and prosperity throughout the world. For example, the Asia-Pacific Partnership on Clean Development and Climate (APP), launched by ministers from the six APP countries in January 2006, exemplifies America's action-oriented public/private initiative that seeks to accelerate the development of clean energy technologies. The U.S. is working in partnership with other governments, non-governmental organizations, and the private sector to transform how energy is produced and consumed. To provide enough financial support for these much-needed endeavors, the U.S. Government, from Fiscal Year 2001 through Fiscal Year 2006, has provided approximately $29 billion to climate science, technology, international assistance, and incentive programs.

BUSINESS & ECONOMICS

16. A FISCAL CHALLENGE FOR THE NEW CONGRESS

By Clive Crook. National Journal, v. 38, no. 18, November 18, 2006, pp. 18-19.

Crook says the biggest economic challenge facing the U.S. Congress is restoring the long-term balance between taxes and spending, but the Democrats don't appear to be any more willing to face this challenge than the Republicans. On trade, he predicts the protectionist trend to continue and doubts Congress will renew the president's trade-negotiating authority – which makes the prospect of a successful Doha Round of global trade talks even more remote. He also expects Congress to pass a minimum wage increase. The Alternative Minimum Tax (AMT) is another issue on the Democratic agenda. Overall, Crook is pessimistic that the new Congress will have the discipline to implement the higher taxes and lower public spending, he feels are needed for fiscal recovery.

17. PLAYING WITH FIRE – THE 10 TCF/YEAR SUPPLY GAP – PART I

By Andrew Weissman. Energypulse.net, posted December 15, 2006
http://www.energypulse.net/centers/article/article_display.cfm?a_id=1388

In the first of a four-part series on the natural gas supply risks facing the United States, the author warns that the U.S. will be facing an unprecedented shortfall of natural gas within the next decade. He notes that North America is running short of natural gas, with older and larger gas fields becoming depleted and new discoveries being much smaller in size and experiencing very fast rates of depletion. Despite an exploration boom – almost a quarter of a million new gas wells have been drilled in the U.S. and Canada since 2000 – supply has not increased. He partly lays the blame for the lack of a sense of urgency in addressing this impending crisis on inaccurate or highly speculative forecasts by the Energy Information Administration and some private forecasting firms, which he says have underestimated by far the amount of natural gas needed to run the U.S. economy. He urges the development within the coming year of a comprehensive national strategy to reduce U.S. dependence on natural gas for electricity generation. He notes that past price spikes have already driven the most price-sensitive natural gas users out of the U.S. market, and that if an alternative strategy is not implemented soon, the price increases needed to match supply with demand by 2020 could be "brutal ... potentially resulting in the permanent shutdown of a significant portion of the manufacturing sector in the U.S."

18. WHO CARES ABOUT CORRUPTION?

By Alvaro Cuervo-Cazurra. Journal of International Business Studies, no. 37, 2006, pp. 807-822.

Cuervo-Cazurra analyzes the relationship between corruption and foreign direct investment (FDI). Many empirical studies support the premise that corruption in a host country has a negative relationship with FDI, he writes. However, he adds, some scholars argue that corruption can have a positive impact on investment by facilitating transactions in countries with excessive regulation. His analysis compared countries that had signed the Organization for Economic Co-operation and Development (OECD) Convention on Combating Bribery of Foreign Public Officials versus those countries that did not sign it.

19. WILL EMERGING MARKETS ESCAPE THE NEXT BIG SYSTEMATIC FINANCIAL CRISIS?

By Kenneth Rogoff. Cato Journal, v. 26, no. 2, Spring/Summer 2006, pp. 337-341.

For the past four centuries, emerging market debt crises have broken out like clockwork, says Rogoff. But in today's world, he notes, emerging market debts are near record lows and most countries are able to borrow liberally from international capital markets. Rogoff summarizes both the optimistic and the pessimistic views of globalization's impact on the financial future of emerging markets. He concludes globalization has helped yield a deeper and more sustained economic expansion than in the past, but he also expects emerging market debt crises to recur in the next decade.

INTERNATIONAL POLITICAL RELATIONS & SECURITY

20. THE CONFERENCE ON DISARMAMENT: MEANS OF REJUVENATION

By Michael Krepon. Arms Control Today, v. 36, no. 10, December 2006, pp. 18-22.
http://www.armscontrol.org/act/2006_12/Krepon.asp

Krepon says that the forum in Geneva that has negotiated treaties setting norms against nuclear weapons testing and prohibitions against chemical and biological weapons "has fallen on hard times." Ambassadors assigned to the Conference on Disarmament (CD) "now moonlight" on other diplomatic assignments in Switzerland, whereas they once worked on tight deadlines "to hammer out key provisions governing on-site inspections and schedules of prohibited substances." Unfortunately, Krepon says, the CD has outgrown its mission. Even though the CD continues to be deadlocked by outmoded consensus rules, he says there is still a role for coalitions of the willing – made up of government and non-government experts – to meet periodically in Geneva to lay out the groundwork for agreements (not necessarily treaties) on issues such as fissile materials or security in space. Informal meetings might usefully pursue interim steps, the author adds. Doing this and offering workshops to promote better understanding of important technical arms control issues and challenges is one way for the forum to achieve at least some progress in the absence of a broader consensus. With some adaptation, he says the once distinguished CD could again have "a useful future."

21. DIALOGUE WITH ADVERSARIES

By Arlen Specter and Christopher Bradish. Washington Quarterly, v. 30, no. 1, Winter 2006-2007, pp. 9-25.

This article encourages bilateral and multilateral talks between the United States and adversaries, specifically Iran and North Korea. Senator Specter argues that the U.S. must engage with Iran and North Korea regardless of feelings about the countries' policies and leadership. The senator gives examples of successful diplomatic efforts with Cuba and Syria, two other nations viewed as adversaries. He also describes a recent trip to Venezuela where he met with Hugo Chavez and convinced the president to meet with the U.S. ambassador, something Chavez had initially been unwilling to do. Specter concludes that in his experience, engaging political leaders, regardless of America's position on their leadership, will lead to more successful diplomacy and may even prevent armed conflict.

22. EUROPE AND CHINA: IT'S NOT JUST THE ECONOMY

By Bruce Stokes. National Journal, v. 38, no. 46-47, November 18, 2006, p. 41.

The author points to several potential points of contention between the European Union and China. He notes that EU member countries often favor short-term commercial advantage over longer-term political objectives, such as the recent confrontation with the U.S. over arms sales to China. The Europeans decided to maintain the

ban, but the issue is likely to resurface since the Europeans believe that "if they don't sell arms to the Chinese, the Russians will." Stokes also expects friction between Europe and China over oil, since both depend heavily on imports from the Persian Gulf. He concludes that "on a range of geopolitical issues [such as human rights], Europe is still reluctant to step up to the plate when it comes to China."

23. THE NEW MIDDLE EAST

By Richard Haass. Foreign Affairs, v. 85, no. 6, November/December 2006, pp. 2-11.

Haass, the president of the Council on Foreign Relations, identifies the Iraq war as the primary factor precipitating the end of the American era in the Middle East. Other factors include the collapsed peace process, the rise of radical Islam and satellite television. He predicts rising challenges to U.S. influence from regional and outside actors, a stagnant peace process, a chaotic Iraq, high oil prices, more militias, more Islamic radicalism and continued terrorism. He says the U.S. should favor multilateral diplomacy over military force to address the region's problems and curb its oil consumption.

24. THERE ARE NO SHORTCUTS TO "THE END OF HISTORY"

By Francis Fukuyama. New Perspectives Quarterly, v. 23, no. 2, Spring 2006, pp. 35-38.
http://www.digitalnpq.org/archive/2006_spring/09_fukuyama.html

Fukuyama points to several illusions that he believes led to the current American position in the Middle East. These include the existence of weapons of mass destruction, the speed with which Iraq would transition to a successful democracy, and the reaction of the world to the invasion of Iraq. To remedy its current predicament, America needs more of a political strategy and less of a military one, and it should reshape the world by establishing multilateral institutions that will create long-term incentives for stability.

DEMOCRACY & HUMAN RIGHTS

25. ELECTIONS: RELIABILITY TRUMPS COMPETENCE: PERSONAL ATTRIBUTES IN THE 2004 PRESIDENTIAL ELECTION

By Martin P. Wattenberg. Presidential Studies Quarterly, v. 36, no. 4, December 2006, pp. 705-713.

The author argues that while partisanship, issues and the character of presidential candidates are thought to be the main determinates in voting behavior, character trumped all of these in the 2004 election. Wattenberg rates the candidates' character using five factors: competence, integrity, reliability, charisma and personal qualities. Using this evaluation system, he found that President Bush had a net personality rating of +20, while it was –30 for Senator Kerry, the largest divide between candidates since 1972. Kerry's lowest marks were on the reliability trait, with one out of five voters evaluating him as weak or indecisive. He also scored low for integrity. President Bush scored low on competence, making him the first incumbent president to be rated below his opponent. The author concludes that Bush's higher ratings on strength and integrity were deciding factors in 2004 because voters wanted a president who would be steadfast and decisive in a time of war.

26. NEW FACES OF 1946

By William E. Leuchtenburg. Smithsonian, v. 37, no. 8, November 2006, pp. 48-54.

The author describes the political atmosphere of post-World War II America and the mid-term elections of 1946. When President Harry Truman took office in April 1945, opinion polls showed that Americans believed by a 2-1 margin that Democrats were better at managing domestic problems. But food and construction material shortages, coupled with post-war inflationary prices had turned the tide against the Democrats by autumn 1946. The Republicans gained 54 seats in the House of Representatives – the largest number since 1894. Truman and his party were sunk politically. But the incoming Republican Congress misinterpreted the public's exasperation and put into place policies that antagonized many citizens. In the 1948 elections, 35 of 50 new Republican House members lost their seats.

27. RAW MATERIAL

By Carl M Cannon. National Journal, v. 38, no. 49, December 9, 2006, pp. 30-34.

The author analyzes Illinois Democratic Senator Barack Obama's potential for becoming the next U.S. president. Obama is very popular, despite having served as a U.S. Senator for only 22 months; he does not have the experience other presidents have had, such as service as a governor or a military officer. On the other hand, Obama appeals to many who feel he is similar to John F. Kennedy. Additionally, he is a "fresh face with an uplifting story at a time when Americans, always susceptible to a fad, are looking for the Next Big Thing, particularly when it comes to their governance," the author writes. Even some Republicans contend that Obama represents hope, talent, diversity, and a personality much different from President Bush, the author notes.

COMMUNICATION & INFORMATION

28. NOAH'S MARK

By Jill Lepore. New Yorker, v. 82, no. 36, November 6, 2006, pp. 78-87.

The author recounts the difficulties faced by lexicographer Noah Webster. His plans, announced in 1800, to create a dictionary depicting how common Americans actually wrote and spoke were attacked bitterly across the U.S. political spectrum. Elitist Federalists criticized Webster's permissive linguistic standards, argued against acknowledging a uniquely American variant of English and linked the project with the perceived Jacobin excesses of the French Revolution. Republicans opposed Webster's own high Federalist politics. Because Webster's Dictionary did not appear until 1828, political objections faded, removing a prime obstacle to the work's acceptance.

29. TELEVISION AND THE INCUMBENCY ADVANTAGE IN U.S. ELECTIONS

By Stephen Ansolabehere, et al. Legislative Studies Quarterly, v. 31, no. 4, November 2006, pp.469-490.

The incumbency advantage is a well-known phenomenon in the United States in all levels of politics. The advantage grew from one to two percentage points in the 1940s to eight to ten percentage points today. There are many theories as to the reasons for this. The authors studied the relationship between television and electoral competition; after reviewing the data from gubernatorial and Senate elections from the 1940s to the 1990s, the authors conclude that "television has a small, directionally indeterminate, and statistically insignificant effect on the incumbency advantage."

GLOBAL ISSUES

30. DISTILLERY DEMAND FOR GRAIN TO FUEL CARS VASTLY UNDERSTATED

By Lester R. Brown. Earth Policy Institute, January 4, 2007.
http://www.earth-policy.org/Updates/2007/Update63.htm

The author, founder of the Earth Policy Institute (EPI), writes that the U.S. ethanol industry has grown so fast in the last two years that data collection has fallen behind. The U.S. Department of Agriculture estimates that ethanol production will consume 60 million tons of corn from the 2008 harvest, but the EPI, reviewing the combined data of several firms that survey the industry, estimates that more than twice that much corn will be needed. Brown warns that the unprecedented diversion of the world's main food crop for fuel production will affect food prices everywhere, potentially leading to political instability in importing countries around the world. He writes that the U.S. corn harvest is 40 percent of the world's total, and accounts for 70 percent of world corn exports. The state of Iowa alone produces more corn than the entire grain harvest of Canada. Brown urges a moratorium on the licensing of new distilleries until it can be determined how much corn can be used for ethanol without dramatically raising food prices.

31. THE LAST DROP

By Michael Specter. New Yorker, October 23, 2006, pp. 61-71.

Veteran public health and science writer Michael Specter offers a seemingly encyclopedic look at the supply, delivery, and shortage of fresh water in the world, focusing on water in India. Specter notes that the situation seems dire: "somehow, the country has to sustain nearly twenty percent of the earth's population with four per cent of its water." The article does not limit itself to India, but provides a global, historical view about water that encompasses political conflicts, sanitation, health, desalination, wells, dams, rural electrification, bureaucratic bungling, and the global economy.

Specter's conclusions are very positive. "The biggest potential new source of water, not just in Delhi or Dar es Salaam, but in Tokyo and San Francisco as well, is us. By conserving water and pricing it more realistically, we can dramatically reduce our needs."

32. MISSING IN ACTION: ICELAND'S HYDROGEN ECONOMY

By Freyr Sverrisson. World Watch, v. 19, no. 6, November/December 2006, pp. 20-25.

In 1998, Iceland announced its intent to become the first country to achieve a hydrogen-energy based economy, eliminating the use of fossil fuels. The plan included investment in research, equipment and infrastructure investment. According to author Sverrisson, an independent energy consultant, Iceland seems to have done little to implement its plans, instead offering itself as a platform for demonstration projects and technical testing. Iceland has been courted by major international aluminum companies and is in the process of building three large hydroelectric dams designed to support energy-intensive aluminum smelting. Stating that an investment in aluminum processing does not bring the same level of highly skilled jobs that scientific research and development in hydrogen could provide, the article goes on to explore the economic and environmental impacts of Iceland's energy policies and how the construction boom will serve to subsidize the power needed for aluminum processing. The article concludes with the author's opinion that the Icelandic government plans a full privatization of the electricity sector as a boost to the economy and to recoup its investment, an action which it has disavowed. If privatization is pursued, the government would be forced to sell its hydroelectric plants below the cost of construction to attract buyers because of subsidies to the aluminum processors.

33. RETHINKING THE FALL OF EASTER ISLAND

By Terry L. Hunt. American Scientist, v. 94, no. 5, September-October 2006, pp. 412-419.

The author notes that conventional wisdom has it that the fall of the Rapa Nui (Easter Island) civilization was the result of deforestation and environmental destruction by human activity. However, in doing archaeological research on the island, Hunt found evidence that did not fit in with the standard theories of how human civilization on Easter Island collapsed. He believes that a major culprit was a ballooning population of Polynesian rats, which fed on palm seeds, prevented the palm trees from regenerating; deforestation by rats had occurred on other islands in the South Pacific. Virtually all the palm-seed shells Hunt's team found on Easter Island showed signs of being chewed by rats. Whether the rats were stowaways on the vessels of earlier arrivals, or if they were brought in as a source of protein, remains unclear. Hunt notes that Easter Island is often pointed to as a case study of what humanity faces in today's global environmental crisis, and he expresses "some unease that Rapa Nui does not provide such a model." Ecosystems are complex, he writes, and we need to understand them better.

34. THE THIRTEENTH TIPPING POINT

By Julia Whitty. Mother Jones, v. 31, no. 6, November/December 2006, pp. 45-51, 100-101. http://www.motherjones.com/news/feature/2006/11/13th_tipping_point.html

The author notes that John Schellnhuber, science adviser at the Tyndall Centre for Climate Change Research, has identified twelve global-warming "tipping points", such as changes in the Greenland ice sheet, shifts in the North Atlantic or Antarctic Circumpolar currents, or the melting of snow cover on the Tibetan plateau, which if triggered, could initiate sudden and unpredictable changes in the global climate. Most humans may have never heard of them, although the well-being of future generations may depend on what happens. Whitty wonders, "what will it take to trigger what we might call the thirteenth tipping point: the shift in human perception from personal denial to personal responsibility?" She notes that "we are born with powerful tools for overcoming our perilous complacency;" Americans changed "with breathtaking speed" in 1941 to fight global enemies in Germany and Japan. While tipping points can happen dizzyingly fast, the good news is that we can change, and change fast, even in the absence of perfect knowledge.

U.S. SOCIETY, VALUES & POLITICS

35. DR. HELENE GAYLE: A DIFFERENT KIND OF CARE PACKAGE

By Lynette R. Holloway. Ebony, v. 62, no. 2, December 2006, pp. 146-147, 150.

Dr. Helene Gayle is the first African-American to serve as president and chief executive of CARE, a global poverty-fighting organization. In this biographical sketch, Holloway traces Gayle's career from the late 1970s, when she was one of the few African-American women

enrolled in medical school, to the present, emphasizing the determination, energy, and empathy that have characterized her life. Under Gayle's leadership, CARE recently kicked off its "I Am Powerful" campaign, whose goal is to improve the health, education and economic opportunities for women in developing countries. Believing that improving the lives of women can have a positive impact on their communities, Dr. Gayle contends that "if you can give individuals the tools to access [their] basic needs, it can lift people out of poverty ... My hope is to make a difference."

36. JOHN HAMMOND'S JAZZ

By Terry Teachout. Commentary, v. 122, no. 3, October 2006, pp. 55–59

The author recounts the career of record producer John Hammond, "one of the very first people to think seriously about jazz – to treat it not as commercial jazz music but as an art form deserving wider and deeper consideration." Hammond was known for his ability to discover young and underappreciated talent. Discoveries and signings included Billie Holiday, Count Basie, Benny Goodman and Teddy Wilson. He was an instrumental force for the integration of jazz groups, and originated the idea of expanding Goodman's trio to a quartet by adding the African American vibraphonist Lionel Hampton. Rejecting the be-bop style that predominated during the 1950s, Hammond shifted his focus to rock and folk music, eventually signing both Bob Dylan and Bruce Springsteen to their first recording contracts.

SCIENCE & TECHNOLOGY

37. THE CANCER OF DORIAN GRAY

By Ben Harder. Science News, v. 170, no. 19, November 4, 2006, pp. 296-297.

The author notes that recent research suggests that aging may be an "inescapable cost of averting malignancy." New studies find that, by engineering a strain of mice that allows cells to regenerate, prolonging youth, the mice also develop cancer and die young – a scientific twist on the hero of the Oscar Wilde novel, Dorian Gray, who hated aging, and whose body did not grow old, but whose portrait suffered the ravages of time. Rapid cell division is a sign both of youth, and of cancer development. "Aging itself may be part of the body's anticancer machinery," says one scientist. A protein known as p16, which erodes cells' ability to replicate, grows more abundant with age in certain mammalian tissue.

38. HOW TO BUILD AN INVISIBILITY CLOAK

By Josie Glausiusz, Discover, v. 27, no. 11, November 2006

Great media excitement met the announcement in May 2006 that Duke University physicists had made an object invisible. The object, a small metal cylinder, was invisible to microwaves because shielding with a metamaterial bent the waves to prevent the object from reflecting or absorbing them. But, this experiment does not mean that all sorts of objects will soon become invisible to human sight. Achieving a similar result for visible light is much more complex because visible light is composed of a range of wavelengths which are much shorter than microwaves, thus requiring the shielding elements to be designed on a nanometer scale. Other physicists have used a mathematical approach to develop a super-lens that cancels light waves to make dust particles invisible. How quickly the research will develop to enable a large object, such as an airplane, to become invisible is only speculation, but the military is funding such research and exploring applications of invisibility technology in communications and energy generation.

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